# FYP Ideas - Fall 2023

### 1. FYP Title

FYP Highlights

### 2. Road Awareness in Smart Cars using Raspberry pi

RAR is an AI/computer vision based system that will provide assistance to the driver as road awareness is added in the rover using deep learning algorithms implemented on Raspberry Pi. The system consists of two stages. The first stage focuses on  “Traffic sign board detection” and the second stage focuses on “Traffic sign classification and recognition”. Video input from the raspberry pi camera module will be taken from the surroundings and whenever a sign appears, the system will generate alerts to notify the driver through an Android application

### 3. FIT - FrameWork For IOT Applications

FIT is a framework that allows users to create complex IoT applications that involve stream processing, event processing, and complex event processing.. FIT is a generic framework aimed to be usable by the diverse users of CEP. A GUI is built upon the framework for generic as well as specific applications. Our GUI will enable users to use some components to create the application's pipeline.

### 4. Autonomous Exploration and Mapping  of Unknown Environments

Scout Rover is a 4-wheeled differential drive robot. It is capable of autonomously navigating in an unknown indoor environment and generate a 2D map of its exploration. A depth camera (Microsoft Kinect v1) is used as the only sensor for capturing data from the environment and processed on a remote server to perform all these operations.

### 5. Blockchain Based Digital Wallet

A general  decentralized application payment system based on Ethereum blockchain technology to support secure payments, and data security. It  can be integrated with any real world application or startups for its payment purposes. Apart from giving payment services we have built our own wallet application to provide wallet services through which users can pay each other using Blockchain Wallet.

### 6. Ground Based Air Defence Intelligent Decision Support System

An Intelligent Decision Support System for Ground Based Air Defence Environments. The FYP consisted of two basic modules.
1- Threat Evaluation
2- Weapon Assignment
The Threat Evaluation subsystem evaluates the incoming Aerial Threat and assigns a Threat Index to the Threat. Based on that Threat Index the Weapon Assignment subsystem call on a Linear Regression model to assign a weapon to that threat. The Django based GIS web app shows the real time simulations asynchronous to the system.

### 7. Biomedical Text Annotation using Knowledge Graphs

We created a web-based semantic biomedical text annotator for gene and disease mentions. For this, we use BioBERT to create models for NER and RE for the two entity types and the ontologies GO and ICD-9 as knowledg bases for entity linking

### 8. The Autonomous Flight Supervisor

Air Traffic Control (ATC) is a mechanism put in place to ensure a safe, efficient and swift flow of air traffic all around the world. The primary objective of ATC is to guarantee separation between the aircrafts, regulate and facilitate air traffic and provide valuable information to the pilots.

### 9. Bussiness Insight and Visualization Assistant

An web based data analysis portal dedicated to an organization and based on its Data Warehouse. It is embedded with multiple interactive statistical visualizations and provide multiple dashboards and a network graph to provide with bussiness insights and meet respective analysis requirements.

### 10. BlindAssistant

Semantic based application to help the blind people in the outdoor.

### 11. Visual Circuit

A drag and drop tool which can be used to build robotic application and can be deployed on server for controlling robots.

### 12. LookOut - Safety Application

Our final year project is majorly centered around an android application which provides safety features such as instantaneously contacting the user’s desired emergency contacts as well as their nearby authorities. We think that with the rise in street crime and overall crime rate in the country coupled with the lack of government’s initiatives and actions to oversee these crime rates, it is a high time to take things into our own hands and start educating the people by spreading awareness. This product aims to provide a sense of safety and security to its users.

### 13. PowerUI - Spotting UI Display Issues

We envision to create a product that can perform black box testing of UI display issues of mobile apps with the flexibility to detect 5 most common issues in the mobile UIs and supports different mobile platforms. PowerUI will target developers and companies in the industry who wants to check the inconsistencies in their mobile app display. If there are any, it will detect and localize the region of issue to help the developer fix the bug quickly.

### 14. GoVitae - Blockchain based CV verification system

Our application is created to facilitate verification of CV for companies, especially in an open house environment.
The course work done by each student will be inserted in the node of a blockchain which will happen each semester till the completion of degree.
The approved stakeholders will be able to search all the work done by students during their degree tenure.
Project is using a custom built Blockchain to provide authenticity, transparency to the work done.
Major plus point is the time saving and transparent record keeping for both the university and the employers.

### 15. Chainify

A platform to build custom blockchains with modular consensus algorithms

### 16. CloudSafe: Cloud Auth Auditor

CloudSafe is a web based AWS JSON IAM policies auditor meant for cloud administrators. CloudSafe will automatic pull IAM JSON policies from an AWS account once provided service account credentials and display the policies in JSON format. A user can then analyze the policies for potential vulnerabilities such as Redundant and Conflicting policies.

### 17. Voice Controllable Web Application

BeMyHand is a voice controllable web application targeting differently-abled people who are unable to use their hands due to some underlying medical cause. It provides them tools like CV Builder, Text Editor, Portfolio Builder and Articles Directory. They can use their voice to operate these tools and surf the entire website be it page navigation, forms filling, scrolling, etc. It provides unmatched ease of use to its users at every stage. BeMyHand provides its users an online presence and a sense of independence in doing so.

### 18. 3D industrial Control Test Bench

The project aimed to map 3 industrial plants i.e Heat exchanger, water treatment and air compression plant onto unity 3D with SCADA and PLC at backend. Cyber attacks are done on these virtual plants i.e on their PLCs and impact can be visualized onto unity of these plants

### 19. Vehicle Speed Checking

Real Time Automated vehicle speed checking system for highways. System will be able to detect Number Plate , brand , type. System will store Extracted Number Plate and details in Database. System will be able to show camera and output on Web Based UI.

### 20. PilotBuddy: A Real-time Anomaly Detection and Fault-Diagnosis Framework for Unmanned Ae

Military UAV missions are often of quite sensitive nature. Precision, accuracy, and low-risk involvement is of high importance in such missions. Fault detection in UAVs, in real-time, can greatly reduce the risk involved in flying and reduce the number of accidents. Pilot Buddy is a team effort to bring down the failure rate in UAV flights through early and timely fault diagnosis. Pilot Buddy is trained on flight datasets containing parameter changes from before and after fault injection in a UAV, enabling it to register UAV behavior changes during a flight and hence, and allowing the program to alarm the user immediately, upon fault detection.

### 21. Image Inpainting Using Deep Learning Models

Image inpainting can be described as a process to restore damaged or deteriorated image, or to enhance an image. The purpose of our project is to explore and use deep learning models on image inpainting in order to get the desired results. The user will be able to Inpaint the images using web app or android app.

### 22. HemaRays

A non-invasive approach to calculate hemoglobin levels through the smartphone camera. The user places his finger on the front camera and a 1 minute video will be recorded . The video shall be converted to frames to get RGB arrays and thus generate a PPG Signal.The PPG signal shall be used to extract features which will be used in the machine learning model to get accurate estimations of hemoglobin values.

### 23. Identification of Degree of Freshness of Fruits and Vegetables

An android application that detects the degree of freshness of fruits and vegetables present in an image. A Yolov5m object detection model has been trained on a dataset of around 60k images of fruits and vegetables. After training, the model has been deployed on a server. User captures image from camera or loads image from gallery or url, then image is transferred to the server where the model predicts bounding boxes along with type and degree of freshness of objects present in the image, and finally the resultant image is sent back to the the android application that displays it. Supported fruits and vegetables include apple, banana, brinjal, chili, cucumber, guava, lemon, orange, pepper, potato and tomato.

### 24. Activity Recognition in Smart Homes Using Ambient Sensors.

For the management and monitoring of elderly people in a smart environment, we will be using deep learning models to identify activities performed by individuals and recorded through multiple sensors deployed in a smart home. In our project, a comparison of different models of Deep Learning is done for the Activity Recognition of Humans in sensor deployed smart homes. We will map the existing Deep Learning techniques (DL to the problem of activity recognition in smart homes. Our major concern is the imbalance dataset which includes some activities with more instances than the others and same activities performed by multiple residents.

### 25. Insider Threat Management System

InTMS aims to monitor employees' systems for malicious activities. The aim is to identify insider threats posed by trusted employees or those provided with special privileges before it is too late. Our project mainly focuses on the organizations with sensitive data like
NESCOM, military, health care, IT and so on. Some of the features include tracking application usage, real time data monitoring, monitoring external devices and to make sure our application is running silently at the backend that no employee knows about. Each entry is captured against the system's name, date and time of the activity. All logs are sent to a remote server where they are securely stored and which only the CEO or a very trusted admin can access. This app allows organizations to keep an eye on their sensitive data and also hold the right person accountable in case of a mishap.

### 26. TailorMaster

An application that takes 2D camera image of a person and generates its 3D model.

### 27. Guftagu

Athena, is an automated graph based Knowledge Extraction System that aims to solve the challenges of linked data by providing users the ability to retrieve and extract meaningful information without the need of having expert domain knowledge. Our system has successfully achieved the conversion of raw text from various genres to a well structured Graph format. This has enabled our users to structure, store, retrieve and analyze data quickly, in runtime.

### 28. Generating Precise Notes from Video Samples

In GoNotes, we extract the audio from video samples, and then transcribe the text from the given audio samples. The text is refined and the lecture will be highlighted to depict the important points and the key terms. The problem that was discovered was that video lectures tend to be quite lengthy and it becomes nearly impossible to revise them without proper lecture notes. So, we used both audio features and textual features to locate emphasized parts of the lectures. This way, by generating precise lecture notes, students will have access to well prepared lecture notes without putting too much effort and saving a lot of time.

### 29. Uvea - Image to Speech for the blind and visually impaired

Uvea is aimed to be a mobile application for the blind and visually impaired that provides assistance and accessibility to them. The application would be doing so using object detection, classification and collision prevention through deep learning techniques.

### 30. Fashion Hunt- Image recognition and visually similar Clothing detection and retrieval

Fashion Hunt a.k.a BrandsWar is a web based application that is designed for searching similar clothing online. It uses deep learning techniques to get similar clothing items from various different brands.

### 31. Threatify

Mobile/web application that takes the camera feed and inform the user about anmolous activities like fire, fighting etc.

### 32. MedsParency

MedsParency is a medicine tracking system which ensures transparency of supply chain by keeping a track of the medicines delivered. By storing the tracks of a medicine through blockchain, one can know whether it comes from a valid source or not. So, buyers can ensure that the medicine they are buying is not fake or a knock-off while being able to purchase it from a local retailer or a popular pharmacy. Moreover, manufacturing and quality standards of both the product and raw materials used can be maintained according to local drug regulatory authorities or WHO standards to lower health risks and side effects. It also ensures price and hoarding control so customers will not be overcharged for short, expensive and sensitive lifesaving drugs and lessens the hassle of a manual documentation of supply chain, which is insecure, by storing it on an immutable and transparent digital ledger that can be accessed by anyone from anywhere.

### 33. ShiftDrive

A user-friendly mobile application that recognizes the car by providing it’s image/video, detects the damage parts of the car, detects severity of the damage parts and provides a platform for workshop procurement for the customer.

### 34. CloudXplor

A system monitoring dashboard for on premise non manageable environments.

### 35. Virtual Classroom

VClass is an android application that will provide the features of a classroom from the comfort of people's home. It combines all the essential classroom features into one application. VClass also uses virtual reality technology for a more immersive and interactive experience.

### 36. E-Utility Services App

E-utility services app is an android application in which we aim to provide fast and responsive solutions for customers where they can search for a number of services; Electrician, Plumber, AC Repair, Mechanics, Carpenters etc. Location of these service providers will be available through map, customers will be able to search, contact, book and track service provider on map. After completion of work the customer can complete the booking, give rating and pay the bill by using Jazz Cash option or Pay by Cash option. The best service provider recommendation using skyline query and price prediction for specific service provider is also implemented in our app.

### 37. ArchiTech

ArchiTech is an Android platform that, at its core, allows user to convert their 2D floorplan into navigable 3D models. These models are also viewable in AR. The platform also collects valuable information regarding the floorplan (cost estimates etc) and makes these available to the user. Furthermore, the application provides many platform related interactions for users to explore, share and compare floorplans as well.

### 38. Remote Assistance Through Augmented Reality

RATAR is an augmented reality based remote assistance platform. RATAR platform allows customer care agents technicians to work remotely, executing common technical tasks and maintenance procedures in real-time. The display of real-time 3D annotations on environments and objects help teams solve problems efficiently.

### 39. OJO - Smart Surveillance System

OJO which means an "Eye" in Spanish is a web based system which provides surveillance and reports violent behavior activities to financial institutions. It uses deep learning model to detect weapons and violence in a live stream cctv camera or recorded video. The system will then generate a red alert and enables the user to take action. He can then inform the LEAs who will receive the alert notification via SMS. User can also monitor the logs of the detected activity.

### 40. BrandHub

BrandHub is a web application that acts as your online shopping companion and as a hub for Pakistani clothing brands. The data on our application has been scraped off from the official websites of these brands.
Our product allows the users to search for items similar to what they want, make a match with their outfits, save their favourite items and make price and brand comparisons.
The main goal is to save the valuable time and effort of our users.

### 41. RanDecII

A desktop application named Ransomware Detector that detects Ransamware infected files

### 42. Charity Go

A social trustworthy collaborative website where Donors and Non Profit Organizations interact to ease the difficulties in Charity Process. Organizations can initialize campaigns and projects and donors can view them and their real time updates.

### 43. Virtual Classroom

Interactive web platform for students and institutional mentors to take online education. Students will be able to interact with their mentors with full ease but it'll mostly be focused on providing the mentors a platform or tool through which they can take an in-depth report about every student's performance and also go through the student engagement in classroom activities.

### 44. SmartSlides

We developed a system that can capture the teacher's whiteboard notes along with its respective slide. Hence, we designed and developed an Android/iOS and web app where the application will be able to record the lectures, apply our trained model to extract notes from the whiteboard and attach it with its respective slide and view them on SmartSlides which let you manage multiple courses, invite people and add them to the course and carry out threaded discussions.

### 45. A machine-learning based load-balancing application scheduler for CPU-GPU system

Troodon is a scheduler that schedules OpenCL programs on the basis of device suitability and load balancing for optimal performance of heterogeneous system's with one CPU and GPU device.

### 46. SmartGharana

SmartGharana is an automated home system. It features a home assistant and home security in a single application that will help the user save time by simplifying daily tasks. The system uses natural language processing and image processing techniques to automate and assist users.

### 47. Obstructy - Remove to improve

Obstructy is an Android native video editing application.  Its salient feature is the removal of unwanted obstructions (e.g. fences, grills, reflections, etc.) to provide an "unobstructed" image from a video, while also providing video editing features. Uses a recent work from the year 2020 involving deeplearning.

### 48. Artificially Intelligent Psychiatrist Bot for Elderly People

Artificially intelligent android application which provides users with a therapist bot on their phone. It works by providing the users with an interface where they can have conversation with the bot, it will calculate the emotion scores and give relevant responses in return. These responses can also include recommendations generated using the user's messages and interests. Also, users can see their emotional history via a graph, and write daily journals to have a great experience using app.

### 49. MeetingScheduler

MeetingScheduler is an AI Based virtual assistant that takes away the hassle of scheduling meetings from its users and manages the schedule on its own. The virtual assistant manages/ updates its users' calendars and informs users about upcoming meetings. It is a web application that provides an interactive chatbot interface to help its users communicate and query easily with the virtual assistant.

### 50. JustC

JustC is a web application based on Python Flask. It takes the user webcam feed as an input and determine where a person is gazing at the screen. The system then uses the data to let the user control social media applications ie YouTube and Twitter.

### 51. Racism Detection

ExRaDe is an web application which classifies whether given comment is a racist or not.Our system focuses on finding racism, enabling the user to detect which tweet or social media post is racist.We have trained our model to detect racism in roman Urdu.Moreover, we have provided the web interface to show results to the users.

### 52. Smart Eye

SmartEye is a web based application aimed at aiding businesses in their marketing. It will provide them with statistical reports regarding their ad placement with statistics such as number of interested people, their age brackets, gender etc.

### 53. Scalable aggregation of text using big data tools

Our fyp revolving around data engineering where we are using big data tools( apache kafka, apache spark ). It ingest two data lakes and stream through kafka and process them in 3 pipelines using apache spark. The generated results from 3 pipelines are directly written into Again kafka brokers. As soon as kakfa receives processed results, a listener write result into firebase. Gui part involves fetching result from firebase and show them in website.

### 54. Contract Drafter With ASR in Urdu

Developing an ASR for Urdu and back-end android application for property dealers (short meetings). The calls transcribe into urdu text and in an end a draft shall be generated for the deals.

### 55. SpeakCV

SpeakCV, is an automatic CV generating system for native Urdu speakers that gets information from speaker's voice and generates a professional CV.
The user will answer a few questions in Urdu and user's speech data will be sent to a speaker independent ASR for speech recognition. Once speech is recognized, it is then corrected using Language Model. The corrected transcript is then translated to English. After text translation, our system will extract CV specific data and display it on a professional CV template

### 56. Automatic Speech Recognition for Urdu

Project aims at providing call transcription by not only doing exceptional continuous speech recognition but also the identification of multiple speakers using various Natural Language Processing (NLP) techniques. Sentences. The user will speak or provide audio and the website will provide the text of the spoken words. This will help users to further store and use the transcribed data and apply other Natural Language Processing techniques to obtain meaningful data.

### 57. Interactive chatbot for admission inquiries in roman urdu

we developed an interactive and intelligent chatbot that understands and gives dynamic responses to students' queries in Roman Urdu. Our chatbot can handle different spelling variations of Roman Urdu words, detect offensive language, handle out-of-scope questions, asks follow-up questions and remembers the context of the conversation. We used the RASA framework for the development of our chatbot and we got an average accuracy around 94% and an average F1 score of around 84% for all the user intents.
It handles questions/queries falling in more than 50 different categories

### 58. ShopSpot

We made a Web application in MERN Stack, named ShopSpot, for people with busy routines to have their own personal clothe recommender which recommends according to user's preferences and interest. The main motivation behind creating this application is to help people struggling with finding their clothes according to their preferences.

### 59. Augmented reality in Kindergarten

We developed an android application that uses augmented reality (AR) to help children in pre-school improve their understanding of the environment around them. We aim to achieve this goal using computer vision and machine learning. 3D models will be displayed by implementing scene and object detection. Children can acquire information about their surroundings by using their smartphone's camera.

The application is makes use of our trained models to perform object detection and generate 3D models of the concepts being taught in their books. Moreover, the application make use of high contrast colors, animated text, and speech commands so it is easy and intuitive for the children to identify the application's features. Scene detection will make use of neural networks, relevant machine learning algorithms, and classifiers.

### 60. TryItOut

TryItOut is a platform where users can virtually edit and try out garments. The project has multiple features such as TextureMod, where people can provide the input image of the garment and they can map the texture of their own choice on that garment. In TailorMod, the user can map the neckline of one garment on the other. In GarmentTransfer, the user will provide a picture of themselves and of the garment they want to try, and the garment will be realistically re-rendered on the user's body. In MotionTransfer, the user can try out the garment by providing their video as well.

### 61. DigiLab

DigiLab is an Augmented Reality based application that enables students of Secondary Level to do their lab experiments of Physics using just their Android phones. Using AR, we aim to digitalize the labs so that the information can be overlaid over the objects anywhere in real-time to give direct understanding of physics concepts. DigiLab will aim to revolutionize Labs/Practical in the Education Sector. There will be selected experiments according to the latest curriculum of Secondary Level's Physics Practical. It would supplement current pedagogical materials by simply adding more contextual experiences.

### 62. TrueDetective

(1) TrueDetective is an intelligent system that finds a person through their face.
(2) The face of the person may be bare face or disguised.
(3) Their are 4 disguises in the data ( face mask, glasses, fake beard, hats )
(4) The recognition is done on CCTV images and videos.
(5) The data is self collected images from cctv point of view. (full info on github)

### 63. ARoute

ARoute, is an Augmented Reality based indoor navigation, which provides an organization to increase their services, i.e. by providing an indoor navigation of their users. It will provide the user to act as an organization, in order to scan an area, and implement indoor navigation on it or to use indoor navigation of the requested area. The app will build the indoor map using Apple's ARWorldKit and will show the shortest route from sourceto destination using Augmented Reality objects.

### 64. Fast Sports System

System that manage sports related activities in university.